REMARKS

This Amendment and Response is submitted in reply to the Office Action dated March 31, 2008, in which the Examiner:

objected to the drawings under 37 CFR 1.83(a), as not showing every feature of the invention specified in the claims;

rejected claim 7 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to disclose in the specification or drawings a "first portion downstream of the second and third (non-straight) portions and the first portions having a varying cross-section which increases from upstream to downstream";

rejected claims 1, 4 and 5 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,684,823 to Plavnik et al;

rejected claims 3, 6, 8 and 16-20 under 35 U.S.C. § 103(a) as being unpatentable over Plavnik '823 in view of U.S. Patent No. 2,972,502 to Jennings et al; and

rejected claims 2 and 9 under 35 U.S.C. § 103(a) as being unpatentable over Plavnik '823 in view of Jennings '502 and further in view of U.S. Patent No. 5,494,004 to Hunter.

Applicants respectfully address and/or traverse the objection and rejections below. Claims 1-9 and 16-26 are currently pending, claims 10-15 having been cancelled by the present amendment and claims 21-26 having been newly proposed by the present amendment. No new matter has been entered by the present Amendment and Response.

The drawings were objected to under 37 CFR 1.83(a), as not showing every feature of the invention specified in the claims. Applicants respectfully submit that the drawings, as filed, correctly show the portions of the conduit and the varying cross-sections of certain segments. In particular, Figs. 2, 3, 7 and 8 best show this feature as recited in claim 7 and newly proposed claim 23. These figures clearly show "a first portion (60); a second portion (84) upstream of the first portion (60); and a third portion (86) between the first and second portions," as explicitly recited in claims 7 and 23. The "first and second portions [having]

essentially uniform internal cross-section[s] along their respective lengths" is shown in Figs. 1-4, and in the perspective view of Fig. 8. It will be readily apparent from these figures, showing a preferred embodiment, that the first portion (60) is a cylindrical tube having an essentially uniform cross-section throughout its length, i.e., the inside diameter and cross-sectional area of the first portion (60) is essentially constant/uniform throughout its length. The same is true for the second portion (84).

Furthermore, Fig. 3 clearly shows the third portion (86), currently recited in claims 7 and 23, with:

> "a downstream portion having an internal cross-section essentially similar to the internal cross-section of the first portion; an upstream portion having an internal cross-section essentially similar to the internal cross-section of the second portion and smaller than the internal cross-section of the downstream portion; and a transition portion having an internal cross-section that transitions from essentially similar to the internal cross-section of the upstream portion to essentially similar to the internal cross-section of the downstream portion."

As can be seen from Fig. 3, the diameter of the left-most (upstreammost) part of the third portion (86) is essentially the same as the diameter of the second portion (84). Additionally, the right-most (downstreammost) part of the third portion (86) has essentially the same diameter as the first portion (60). The transition portion is shown between the two flanges of the third portion (86); the smaller diameter of the upstream end transitioning to the larger diameter of the downstream end.

As the drawings show every feature of the invention specified in the claims, as amended, Applicants respectfully request that the present objection to the drawings be withdrawn.

Claim 7 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to disclose in the specification or drawings a "first portion downstream of the second and third (non-straight) portions and the first portions having a varying cross-section which increases from upstream to downstream." In response, Applicants have amended claim 7 to more particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

The Examiner has also stated that it is "not quite clear in what way the cross-sections are similar – area, shape, etc." Applicants respectfully submit that it will be readily apparent to one of ordinary skill that the conduit portion cross-sections may be similar in area or shape. If, for example, the first conduit section has a square cross-section, it will be desirable for the conduit portion adjacent thereto to have a cross-section similarly square in shape to facilitate the progression of the pressure way through the conduit. In addition, it will be readily appreciated that the cross-sections may also be similar in area for the same reason. As the goal when joining the conduit sections is to have an essentially smooth internal surface throughout the entire length of the conduit, it necessarily follows that to achieve such smoothness, the internal cross-sections must be similar in both shape and area. Applicants respectfully submit that the similarity of the cross-sections means both similar in shape and similar in area, as will be apparent to one of ordinary skill in the art. Accordingly, Applicants respectfully request that the 35 U.S.C. § 112, second paragraph rejection of claim 7 be withdrawn.

Claims 1, 4 and 5 were under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,684,823 to Plavnik. For a 35 U.S.C. § 102(e) rejection to be sustained, a single piece of prior art must show or disclose *each* and *every* element of the claimed invention. If any one element of the claimed invention is not shown or disclosed in the prior art, then the anticipation rejection is improper.

Without conceding to the validity of the Exmainer's outstanding rejection, and solely in an effort to advance prosecution, Applicants have amended independent claim 1 to further define over Plavnik '823 and the other cited prior

art of record, either alone or in combination. Applicants respectfully submit that Plavnik '823 does not show or disclose, at least, each and every element of newly amended independent claim 1.

With respect to claim 1, and as discussed in the specification, the present invention is directed to a detonative cleaning apparatus for cleaning soot off of internal boiler components and the like. It will be readily appreciated by one of ordinary skill in the art that one problem with detonative cleaning apparatuses is that they generate enormous reaction forces upon the combustion and discharge of the air/fuel mixture into the vessel. To control these forces and to ensure the correct placement of the combustion conduit for subsequent firings, customers are forced to build costly structures to support the load generated by such combustion. The present invention solves this problem by the inclusion of a damping means, as recited in newly amended claim 1.

As discussed, *inter alia*, in paragraph 27, the present invention achieves the damping of reaction forces through the utilization of a reaction strut in series with one or more metal coil reaction springs coupled to the last mated flange pair (closest to the vessel wall) and connecting the combustion conduit to a structure such as the furnace wall. This damping means resiliently absorbs reaction forces associated with the discharging of the soot blower and ensures correct placement of the combustion conduit for subsequent firings. This embodiment can be best seen in Fig. 2. Optionally, additional damping may be provided, and the reaction strut/spring combination may be formed as a single length or loop.

In stark contrast, Plavnik teaches a known impulse generator for producing pressure waves wherein the "outlet conduit (30)" is "attached to the boiler (16) by a bolted flanged connection or other attachment means." (Col. 6, lines 24-32). It will be readily apparent that Plavnik is not concerned with the problem that the present invention solves, i.e., the damping of reaction forces generated by the combustion of the air/fuel mixture and ensuring correct placement of the combustion conduit for subsequent firings. Such rigid attachment may lead to the deformation or catastrophic failure of the combustion conduit due to the extreme reaction forces generated by such combustion.

Plavnik is simply incapable of absorbing, and thus controlling, the enormous reaction forces generated by the discharge of the apparatus, as explicitly recited in independent claim 1, as amended. As such, Plavnik does not show or disclose a damping means, as explicitly recited in independent claim 1, as amended.

Independent claim 1, as amended, recites, *inter alia*:

"An apparatus for cleaning a surface within a vessel…comprising:

> a source of fuel and oxidizer; an igniter for initiating a reaction of the fuel and oxidizer; an elongate conduit having a first end and a second end…and positioned to direct a gas flow of the reacted or reacting fuel and oxidizer through the wall aperture and discharge from the second end; and ***a damping means for absorbing reaction forces associated with said reacted fuel and oxidizer and said discharge***."

Support for this amendment may be found in paragraph 27 of the specification. In addition, the damping means according to one embodiment of the present invention is identified by reference numerals 80 and 82, and can be seen in Fig. 2. Accordingly, no new matter has been entered by the present amendment.

It will be readily appreciated that the present invention's ability to absorb and control reaction forces via the damping means of independent claim 1 ensures the correct placement of the combustion conduit for subsequent firings and lowers a customer's installation costs, for the reasons described above. As neither Plavnik, nor any of the other cited references, either alone or in combination, show or disclose a "damping means for absorbing reaction forces," as recited in independent claim 1, as amended, Applicants respectfully submit that independent claim 1 is now allowable. In addition, Applicants respectfully submit that claims 2-9, which depend therefrom, are allowable for at least these reasons.

Moreover, Applicants respectfully submit that claim 7 is allowable for additional reasons aside from its dependency on independent claim 1, i.e., claim 7 is allowable standing on its own. Applicants hereby incorporate, and respectfully direct the Examiner to the arguments below in connection with newly proposed independent claim 23, as dependent claim 7 and independent claim 23 contain similar subject matter.

Applicants have newly proposed independent claim 23 to further define over the cited prior art. Claim 23 recites, *inter alia:*

"An apparatus for cleaning a surface within a vessel…comprising:

an elongate conduit having a first end and a second end…and

wherein said conduit consists comprises at least three portions:

a first portion;

a second portion upstream of the first portion; and

a third portion between the first and second portions;

wherein the first and second portions have an essentially uniform internal cross-section along their respective lengths; and

wherein and the third portion includes:

a downstream portion having an internal cross-section essentially similar to the internal cross-section of the first portion;

an upstream portion having an internal cross-section essentially similar to the internal cross-section of the second portion and smaller than the internal cross-section of the downstream portion; and

a transition portion having an internal cross-section that transitions from essentially similar to the internal cross-section of the upstream portion to essentially similar to the internal cross-section of the downstream portion."

Applicants respectfully submit that neither Plavnik, Jennings, nor Hunter, nor any of the other cited art, either alone or in combination, shows or discloses these features of independent claim 23. In particular, none of the prior art references show a combustion conduit having three (3) portions wherein a portion having a transition section bridges the gap between a downstream portion with a larger cross-section and an upstream portion with a smaller cross-section, as recited in newly proposed independent claim 23.

Having addressed and/or traversed each and every rejection, Applicants respectfully request that the rejections of claims 1-9 and 16-20 be withdrawn, and that claims 1-9 and 16-26 be passed to issue.

Applicants hereby petition for a two-month extension of time. Please charge our Deposit Account No. 13-0235 for the $460.00 fee for this petition. Applicants believe no additional fees are due in connection with this Response. In the event any additional fees are deemed necessary, authorization is hereby granted to charge any such fees to Deposit Account No. 13-0235.

Respectfully submitted,

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